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to restore each cell to its original size, and thus throw the ring back to its original position. He thinks the bubble is formed of the air contained in the cell sap. If this be the case, as the amount of air is a very small per cent. of the cell contents, even should it expand, its pressure could not be so great as that of the surrounding denser air. It is difficult, moreover, to understand why the air in the cell should expand, as there is no diminution of external pressure nor any rise of temperature. The third movement he accounts for by the further evaporation from the cells.

A clear explanation of the causes which produce the dehiscence in the fern sporangia remains to be worked out. The presence of the lip-cells here described, of the existence of which M. du Sablon's figures and descriptions give no recognition, may prove an important factor.

BOTANICAL LABORATORY UNIVERSITY
OF MICHIGAN, June, 1887.

[For other notes on this subject see the BULLETIN xiii, p. 168, ; Ber. Deutsch Bot. Gesell., iv, p. 42 ; Journ. Roy. Mic. Soc. 1886, pp. 828 and 1020 ; 1887, p. 662 ; and Flora, lxx, (1887) pp. 177, 192, 202-208.—ED.]

Notes on the Flora of Cayuta Creek.

Being stationed for a few weeks at Waverly, N. Y. (Tioga Co.), near the mouth of this stream, I determined to work up its bed and shed as far as possible, it being an especially interesting locality to me, as it geographically connects my work in Broome Co. with that of Dr. Lucy in Chemung Co., and of Prof. Dudley in the Cayuga Lake Basin. This little rivulet, having its source in a small lake by the same name situated a little south of east of the head of Seneca Lake and between it and Cayuga, flows southeast for half its length and then mainly south to its junction with the Susquehanna river, just across the Pennsylvania State line, a little east of the center of the southern tier of counties. This stream is about 35 miles long, flows through a narrow valley whose hillsides are mostly cleared and form fine farm lands, and forms a natural county line between Schuyler and Tompkins on the north, and Chemung and Tioga on the south.* Thus far we have only explored the creek from its mouth to "Bingham's Sta.," a distance of about eight miles, yet these few notes will show how peculiarly this region forms the true boundary of that portion of the State termed in geographical flora, "Western New York."

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* Those who are fortunate enough to possess Prof. Dudley's "Cayuga Flora," will find a quite faithful map of this location as a frontispiece.

Archemora rigida, DC., was found about two miles north of the State line. This is the farthest eastern station for this species that we know of; * the individuals differ from the western in having regularly, finely, and closely serrate leaves (not found in Broome Co., nor in the Cayuga basin. Dr. Torrey reports the plant in "western part of the State, rare.")

Oxalis violacea, L., occurs near the mouth of the creek, and about three miles up the stream. This violet-like beauty grows in the alluvium of the creek, in swales where leaves have accumulated and decayed; not on rocks, its usual habitat. (Not found in the Cayuga region, nor as yet in Broome Co.)

Polemonium reptans, L., found near the mouth of the creek, and by Mr. F. V. Coville about three miles north. At the first named station quite a large patch was found intimately associated with *Asarum Canadense* on the alluvial bank of the creek under the shade of a large sugar maple and a clump of *Neillia opulifolia*. (Dr. Torrey, on the authority of Dr. Bradley, reports the plant in Cattaraugus Co. Not found in the Cayuga nor Broome regions.)

Euphorbia corollata, L., a few individuals found on "Spanish Hill," near the mouth of the creek, but full and typical. (Not mentioned in the "Cayuga Flora," still we found a large growth of this species, in 1880, about a mile from McLean, N.Y., within the limits of that region; not found in Broome Co. Dr. Torrey, in New York State Flora, reports the plant, on the authority of Dr. Knieskern, as being found on the rocky banks of the Chemung river; our station, "Spanish Hill," is between this river and Cayuta Creek. We have no knowledge of the plant in Chemung Co., though Dr. Lucy may still report it.)

Asclepias tuberosa, L., "Spanish Hill." (This species is uncommon along the southern tier; we have met with it in Chemung Co., but not in Broome. Prof. Dudley marks it "frequent" in the Cayuga region, especially upon the east shore of the lake.)

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* Both this species and its var. *ambigua*, Gray, occur in eastern New Jersey and on Staten Island, and the type is found also on Long Island.—EDS.

Iris pseudacorus, L. This beautiful, sparingly cultivated European flag, grows in a large patch (about ¾ acre), remote from dwellings, about three miles up the creek, from whence it has become scattered down the stream, here and there, to its mouth, and thence on the right bank of the Susquehanna for about a mile. The farmers living near the original growth all assert, in answer to our questions concerning the origin of the station, that, as far as they knew, "it's alwus ben thar." (Marked "scarce" in "Cayuga Flora," where three stations are given; not found in Chemung or Broome Counties.)

Dioscorea villosa, L. This plant was first detected here by Mr. F. V. Coville; we have since found it at his station and in a few other places along the creek banks. (Found also in a few localities in Broome and Chemung Counties, but not in the Cayuga region.)

Hydrangea arborescens, L. Found in two places within the first four miles of the creek; also located here by Mr. Coville on his trip. (This is one of the plants that Dr. Torrey says "probably grow in the western district of the State of New York." Dr. Lucy has met with it in one station, "The Narrows" of the Chemung river, near Wellsburg, Chemung Co.; it is not found in the Cayuga region, nor in Broome Co.)

Arisæma dracontium, Schott.; *Flœrkea proserpinacoides*, Willd., and *Nyssa multiflora*, Wang., were located here by Mr. Coville, whose stations we have not yet had an opportunity to visit. (Broome Co. affords only the last named; Cayuga has all, and Chemung the first and last.)

Lobelia spicata, Lam., is quite plentiful on "Spanish Hill," where several individuals exist with pure white flowers. (Plentiful in Broome Co.; not found in the Cayuga region, and of Chemung we are uninformed.)

Quercus ilicifolia, Wang., is found on the hills west of the creek, and north of Waverly near the creek. (Not found in Broome Co., nor in the Cayuga region; Chemung Co. ?)

Campanula rotundifolia, L. One of the most beautiful plants we have met this season was an individual of this species two feet high, with a profusion of pure white flowers. The species grows tall and profuse on " Spanish Hill," both in the open woods and over the grassy fields, and averages much larger and more vigorous than in rocky places north, its true habitat, according to authors. (Found in Cayuga region, but not as yet in Broome Co.)

Thaspium barbinode, Nutt., occurs in two localities along the creek, in one of which Mr. Coville also met with it. (Dr. Torrey mentions the plant, on the authority of Dr. Knieskern, as being found in the valley of the Chemung; and Dr. Gray reports it in " Flora of New York," from the Canadian side of Niagara river. The species has not been found in the Cayuga region, nor in Broome Co.)

Cerastium vulgatum, L. Found on the banks north of the reservoir supplying the village of Waverly. (Found also on " House's Hill," Broome Co. ; not in Cayuga Flora.)

Aralia spinosa, L. One individual found on a dry gravelly bank of the creek, near its mouth, on the New York side of the State line. Though this plant grows in a wild place, at a long distance from any habitation, still it may be escaped, though we are fully convinced that it is natural. It is small, and either young or of stunted growth. (This is the only station to my knowledge in the State.)

A number of other species, that are not exactly rare, but of quite infrequent growth along the southern tier of counties, are *Triosteum perfoliatum ; Polygonatum giganteum ; Salix humilis ; Juglans nigra*; *Dirca palustris ; Monarda didyma ; Verbena hastata*, var. *paniculata ; Nymphæa odorata ; Cynoglossum Virginicum ; Mertensia Virginica ; Lysimachia thyrsiflora ; Tragopogon pratensis ; Dipsacus sylvestris ; Gillenia trifoliata ; Vicia Americana ; Lathyrus venosus ; Acer saccharinum*, var. *nigrum ; Linum Virginianum* and *usitatissimum ; Polygala Senega ; Helianthemum Canadense ; Gentiana Saponaria* and *quinqueflora ; Fraxinus pubescens ; Chimaphila maculata ; Cnicus arvensis*, var. *albiflorus ; Taxus Canadensis ; Hypericum Ascyron ;* and *Ranunculus multifidus.*

C. F. MILLSPAUGH.